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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Hans J. Hug

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EXAMINER

LARKIN, DANIEL SEAN

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,690	Applicant(s) HUG ET AL.	
	Examiner DANIEL LARKIN	Art Unit 2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 02 May 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-29 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-22 is/are allowed.
- 6) ☒ Claim(s) 23-27 and 29 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2011 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings were received on 02 May 2011. These drawings are acceptable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-101810 (Hashizume et al.) in view of US 5,811,017 (Matsuyama).

With respect to the limitations of the claim 23, Hashizume et al. disclose a cantilever unit and holder, comprising: a cantilever (71a) having a cantilever tip (10a),

Art Unit: 2856

the cantilever being mounted to a rigid support (71/72, Figures 6-12), wherein a portion of the support has a stepwise recessed flank profile (Figures 7-9) with a width narrowing in a direction towards the cantilever (Figures 6 and 12). Hashizume et al. appear to disclose that the support (71/72) is comprised of silicon, however, Hashizume et al. fail to expressly disclose the material composition of the cantilever (71a) or if an attachment material is used to connect the cantilever to the support.

Matsuyama disclose a cantilever and method of manufacturing said cantilever, comprising, as shown in Figures 1A-1E, a cantilever (124) comprised of silicon supported on a silicon substrate/support (102/122) through a silicon oxide attachment (104). Modifying the structure of Hashizume et al. to provide a silicon oxide attachment between the silicon support and cantilever would have been obvious to one of ordinary skill in the art because Matsuyama has shown that the method provides a structure having a thickness and shape desirable for high-resolution SPM measurements.

With respect to the limitations of claim 24, Figure 12 of Hashizume et al. appear to show that the narrowing of the support takes the form of an irregular hexagon.

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-101810 (Hashizume et al.) in view of US 5,753,912 (Matsuyama).

With respect to the limitations of the claim 23, Hashizume et al. disclose a cantilever unit and holder, comprising: a cantilever (71a) having a cantilever tip (10a), the cantilever being mounted to a rigid support (71/72, Figures 6-12), wherein a portion of the support has a stepwise recessed flank profile (Figures 7-9) with a width narrowing

Art Unit: 2856

in a direction towards the cantilever (Figures 6 and 12). Hashizume et al. appear to disclose that the support (71/72) is comprised of silicon, however, Hashizume et al. fail to expressly disclose the material composition of the cantilever (71a) or if an attachment material is used to connect the cantilever to the support.

Matsuyama disclose a cantilever chip, having a cantilever structure, as shown in Figures 2A-2H, specifically 2G, comprising a cantilever (24) comprised of silicon supported on a silicon substrate/support (20) through a silicon oxide attachment (22). Modifying the structure of Hashizume et al. to provide a silicon oxide attachment between the silicon support and cantilever would have been obvious to one of ordinary skill in the art because Matsuyama has shown that the method provides a structure having a thickness and shape desirable for high-resolution SPM measurements.

With respect to the limitations of claim 24, Figure 12 of Hashizume et al. appear to show that the narrowing of the support takes the form of an irregular hexagon. Matsuyama also appears to show the support as an irregular hexagon.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-101810 (Hashizume et al.) in view of US 5,811,017 (Matsuyama) as applied to claim 23 above, and further in view of US 5,245,863 (Kajimura et al.).

The combination of Hashizume et al. in view of Matsuyama ('017) disclose all of the limitations of the base claim including a reflective portion of the back side of the cantilever being used to deflect incoming light to a detector, as shown in Figure 13. The

Art Unit: 2856

combination, however, fails to expressly disclose that a film is placed on the cantilever and the film has a sloping boundary.

Kajimura et al. disclose an area (18) of high reflectance material on the back side of the cantilever facing away from a sample. The area (18) also appears to have a boundary sloping towards the support (17). Modifying the cantilever to utilize a reflective film would have been obvious to one of ordinary skill in the art as a means of detecting deflection of the cantilever. Modifying a reflective film to have a sloping boundary would have been well within the purview of one of ordinary skill in the art because so as to collect as much light from the laser source rather than having light deflected from the hard edge of a mirror, which could provide for a less accurate measurement.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-101810 (Hashizume et al.) in view of US 5,753,912 (Matsuyama) as applied to claim 23 above, and further in view of US 5,245,863 (Kajimura et al.).

The combination of Hashizume et al. in view of Matsuyama ('912) discloses all of the limitations of the base claim including a reflective portion of the back side of the cantilever being used to deflect incoming light to a detector, as shown in Figure 13. The combination, however, fails to expressly disclose that a film is placed on the cantilever and the film has a sloping boundary.

Kajimura et al. disclose an area (18) of high reflectance material on the back side of the cantilever facing away from a sample. The area (18) also appears to have a

Art Unit: 2856

boundary sloping towards the support (17). Modifying the cantilever to utilize a reflective film would have been obvious to one of ordinary skill in the art as a means of detecting deflection of the cantilever. Modifying a reflective film to have a sloping boundary would have been well within the purview of one of ordinary skill in the art because so as to collect as much light from the laser source rather than having light deflected from the hard edge of a mirror, which could provide for a less accurate measurement.

Claims 26 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,753,912 (Matsuyama) in view of US 5,319,961 (Matsuyama et al.).

With respect to the limitations of claims 26 and 29, Matsuyama ('912) discloses a cantilever chip, having a cantilever structure, as shown in Figures 2A-2H, specifically 2G, comprising a cantilever (24) having a cantilever tip (8), the cantilever further having a back side and a front side opposite the back side, the cantilever also being comprised of silicon and mounted to a rigid silicon substrate/support (20) through a silicon oxide attachment (22) on the back side of the cantilever. Matsuyama ('912) fails to disclose that the cantilever contains a step-like portion on the front side of the cantilever near where the cantilever is attached to the support.

Matsuyama et al. disclose a cantilever chip, as shown in Figures 18 and 19C-19D, comprising a cantilever (106) having a tip (108), the cantilever further having a back side and a front side opposite the back side. The cantilever is mounted to a silicon substrate (102) on a back side of the cantilever. The cantilever (106) is also provided

with a step-like portion on the front side of the cantilever near the location of the support. Modifying the cantilever chip of Matsuyama ('912) to have a step-like portion on the front side of the cantilever would have been obvious to one of ordinary skill in the art because this type of shaping is known to the cantilever manufacturer; and one of ordinary skill in the art would recognize the inherent advantages this shaping provides, such as to balance the weight of the support on the back side of the cantilever.

Claims 26 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,811,017 (Matsuyama) in view of US 5,319,961 (Matsuyama et al.).

With respect to the limitations of claims 26 and 29, Matsuyama ('017) discloses a cantilever and method of manufacturing said cantilever, comprising, as shown in Figures 1A-1E, a cantilever (124) having a cantilever tip (120), the cantilever further having a back side and a front side opposite the back side, the cantilever also being comprised of silicon and mounted to a rigid silicon substrate/support (102/122) through a silicon oxide attachment (104) on the back side of the cantilever. Matsuyama ('017) fails to disclose that the cantilever contains a step-like portion on the front side of the cantilever near where the cantilever is attached to the support.

Matsuyama et al. disclose a cantilever chip, as shown in Figures 18 and 19C-19D, comprising a cantilever (106) having a tip (108), the cantilever further having a back side and a front side opposite the back side. The cantilever is mounted to a silicon substrate (102) on a back side of the cantilever. The cantilever (106) is also provided with a step-like portion on the front side of the cantilever near the location of the

Art Unit: 2856

support. Modifying the cantilever structure of Matsuyama ('017) to have a step-like portion on the front side of the cantilever would have been obvious to one of ordinary skill in the art because this type of shaping is known to the cantilever manufacturer; and one of ordinary skill in the art would recognize the inherent advantages this shaping provides, such as to balance the weight of the support on the back side of the cantilever.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,811,017 (Matsuyama) in view of US 5,319,961 (Matsuyama et al.) as applied to claim 26 above, and further in view of US 5,245,863 (Kajimura et al.).

The combination of Matsuyama ('017) in view of Matsuyama et al. discloses all of the limitations of the base claim including the application of a reflective film on the back side portion of the cantilever (124) (col. 5, lines 40-44). The combination, however, fails to expressly disclose that the film placed on the cantilever has a sloping boundary.

Kajimura et al. disclose an area (18) of high reflectance material on the back side of the cantilever facing away from a sample. The area (18) also appears to have a boundary sloping towards the support (17). Modifying the reflective film to have a sloping boundary would have been well within the purview of one of ordinary skill in the art because so as to collect as much light from the laser source rather than having light deflected from the hard edge of a mirror, which could provide for a less accurate measurement.

Response to Arguments

Applicant's arguments with respect to claims 23-29 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 10-22 are allowed.

Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2856

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL LARKIN whose telephone number is (571)272-2198. The examiner can normally be reached on 8:30 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel S. Larkin/
Primary Examiner, Art Unit 2856